



# KERALA GAZETTE

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**COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY**

## NOTIFICATIONS

(1)

No. Conf. II / 2941/1/2010.

31st July 2010.

*Read :—*U. O. No. Conf . II/2941/1/10 (1) dated 24-3-2010.

In exercise of the powers conferred by Section 24 (ii) read with Section 42 (1) of the CUSAT Act 1986, the Academic Council at its meeting held on 4th February, 2010 resolved to make the Regulations and Scheme of Examination for M.Tech. Programme in Computer Science with specialization in Data Security with effect from 2009-10 Academic Year as appended.

The Syndicate at its meeting held on 19-6-2010 vide item 559.24 considered and ratified the action taken by the Vice-Chancellor in having approved the Regulations and Scheme of Examination for the above said course exercising his powers under Section 11 (11) of CUSAT Act, 1986.

### REGULATIONS FOR M.TECH. DEGREE PROGRAMME OFFERED AT RECOGNISED INSTITUTIONS

#### M.TECH. COMPUTER SCIENCE WITH SPECIALIZATION IN DATA SECURITY

##### 1. Duration of the Course

The course leading to the degree of Master of Technology will span over a period of Four Semesters (two years). Span of a semester will be six months.

##### 2. Conditions for Admission

- Bachelor's degree in engineering in the branch of Computer Science & Engineering or Information Technology with minimum 60% aggregate or equivalent.

OR

- (ii) MCA degree with minimum 60% aggregate or equivalent.

OR

- (iii) Five year integrated M.Sc. degree in Software Engineering with minimum 60% aggregate or equivalent.

OR

- (iv) AMIE/AMIETE in Computer Science with minimum 60% aggregate or equivalent.

Valid GATE score

In the absence of sufficient GATE qualified candidates, score in the entrance test, conducted under the supervision of the University shall be considered for ranking.

### **3. Curriculum**

The curriculum will comprise the courses of study as given in the scheme and the syllabi prescribed therein.

Candidates will be required to undertake a suitable research Project work in consultation with the head of the department and the faculty advisor and submit the project report at the end of the respective semesters, on dates announced by the college/department. There shall be an end semester examination for the Project work, which shall comprise evaluation of the report and conducting Viva Voce.

#### **4. Requirements of attendance and progress**

- (i) A candidate will be deemed to have completed the requirements of study of any semester and permitted to appear each University End Semester Examinations (ESE) only if,
  - (a) The candidate has secured not less than 75% of attendance in each of the subjects of the total number of working days of the concerned semester.
  - (b) His/her progress has been good and
  - (c) His/her conduct has been good
  - (d) He/she has minimum of 50% of sessional marks for each subject.
- (ii) Sessional marks will be awarded on the basis of class tests, assignments, viva-voce, practical assignments term-paper, mini-project, etc.
- (iii) A student who has an attendance and sessional marks lower than 75% and 50% respectively will not be permitted to appear for the end semester exam and he/she has to redo the semester at the next available opportunity, viz., with a subsequent batch. However, a candidate can repeat the semester only once during entire programme.

*Note:*—As these are academic prerequisites no exemption will be granted in these cases whatever may be the causes.

#### **5. Procedure for completing course**

- (i) A candidate may proceed to the course of study for the next semester only after completing the requirements of attendance and progress of the previous semester.
- (ii) A candidate who has passed in a semester cannot repeat the course.
- (iii) A candidate who desires to repeat (only on medical grounds) the course of any semester for want of attendance/progress or who desires to rejoin the course after a period of discontinuance or who upon his/her own request is permitted by the Head of the Institution to repeat the course of any semester, may join the semester which he/she is eligible or permitted to join, only at the time of its normal commencement for a regular batch of students and after obtaining the permission from the University. No student will however be enrolled in more than one semester at any time. In the case of repeaters the earlier assessment in the repeated course will be disregarded.
- (iv) A candidate is eligible for condonation of shortage of attendance only once in the entire programme subject to the conditions given below:
  - (a) His conduct and progress must be good.
  - (b) Condonation will be granted only on medical grounds.
  - (c) The shortage shall not be more than 10% of actual working days.
  - (d) By the recommendation of the head of the institution, the condonation shall be granted subject to rules and procedures prescribed by the University from time to time.

#### **6. Examination & Valuation**

##### **6.1 Theory Examinations**

There will be End Semester University Examination [ESE] at the end of all semesters. There is no provision for improvement examinations. The medium of instruction, examinations, seminar and project report etc. will be English only.

## Valuation

The answer books of University End Semester Examination (ESE) will be valued by faculty members specialised in the concerned disciplines appointed by the University from among the panel of examiners. All theory papers of the semester examinations are to be separately valued by two examiners namely internal and external examiners appointed by the University. The candidate will be awarded the average of the marks awarded by the two examiners.

However if the difference in the mark awarded by the two examiners exceeds 10% of the maximum mark for the subject, a third external examiner will revalue the paper. In such cases, the average of the highest two among the three marks will be awarded to the candidate.

## 7. Passing requirements and provisions

- (i) All 72 credits should be earned by a candidate to be qualified for the degree.
- (ii) The candidate should have cleared all dues to the Institute/University.
- (iii) No disciplinary action is pending against him/her.
- (iv) Passing requirement for a student shall be a minimum of 50% (Theory and sessional put together), subject to a minimum of 50% for the theory.
- (v) A candidate, who is absent or secures less than 50% in ESE in any subject, will retain the already secured sessional marks for subsequent appearance in the examination of that subject.
- (vi) A candidate who fails to submit the report on the project within the prescribed date (or whose report is not accepted for reasons of incompleteness or other serious deficiencies) will have to register, redo the project and submit the report at the end of a subsequent semester.
- (vii) A candidate who successfully completes the course satisfying all the passing requirements of the courses will be declared to be qualified for the award of M.Tech. Degree.
- (viii) Class division shall be as per the scheme followed in the other M.Tech. programmes of CUSAT.
- (ix) Candidates shall be declared to have qualified for the award of the M.Tech. Degree provided the candidate has successfully completed the course requirements and has passed all the prescribed subjects of study in the four semesters within a maximum period of four years from the commencement of his/her study.
- (x) Every candidate shall, based on his/her project work/dissertation, send a paper for publication in journal or a conference in which all papers are published after usual review.

### M.Tech. COMPUTER SCIENCE: SPECIALISATION IN DATA SECURITY

Sl. No.	Course Code	Course Title	Core/ Elective	Credits	Lec.	Lab.	Marks		
							Int. Asst.	Ext. Exam.	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Semester-I</b>									
1	CSD 3101	Mathematical Foundations of Computer Science	C	4	4		50	50	100
2	CSD 3102	Computer Networking	C	4	3	2	50	50	100
3	CSD 3103	Design & Analysis of Algorithms	C	4	3	2	50	50	100
4	..	Elective I	E	3	3	0	50	50	100
5	..	Elective II	E	3	3	0	50	50	100
6	..	Computer Networking Lab	C	1	0	5	100		100
Total for Semester I				19	16	9			600
<i>Electives:</i>									
	CSD 3104:	Theory of Computation							
	CSD 3105:	Software Engineering & Management							
	CSD 3106:	Parallel Computer Architecture							

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>Semester-II</b>									
1	CSD 3201	Information Systems Control & Audit	C	4	4	0	50	50	100
2	CSD 3202	Cryptography & Network Security	C	4	3	3	50	50	100
3	CSD 3203	Seminar	C	1	0	0	50		50
4	..	Elective III	E	3	3	0	50	50	100
5	..	Elective IV	E	3	3	0	50	50	100
6	..	Elective V	E	3	3	0	50	50	100
		Network Security Lab	C	1			100		100
Total for Semester II				19	16	9			650
<i>Electives:</i>									
	CSD 3204:	Data Compression							
	CSD 3205:	Data Warehousing & Data Mining							
	CSD 3206:	Digital Image Processing & Pattern Recognition							
	CSD 3207:	Number Theory & Cryptography							
<b>Semester-III</b>									
1	CSD 3301	Project & Viva Voce	C	18	0	15	100	200	300
<b>Semester-IV</b>									
1	CSD 3401	Project & Viva Voce	C	18	0	15	100	250	350
	Total	Credit							1900

(2)

No. Conf. II/2941/1/2010 (1).

20th September 2010.

*Read:—*Regulation for M.Tech. VLSI & Embedded Systems—Notification No. Conf. II/2941/1/09 dated 16-1-2010.

In exercise of the powers conferred by Section 24 (ii) read with Section 42 (1) of CUSAT Act 1986, (Act 31 of 1986) the Academic Council at its meeting held on 4-2-2010 resolved the following:

“Include Bachelor’s Degree in Engineering in the Branch of Computer Science and Engineering and in the Branch of Information Technology as eligible qualification for admission to M.Tech. VLSI and Embedded Systems, in addition to other eligible branches.”

The Clause 2(i) Eligibility Criteria of M.Tech. VLSI and Embedded System will now be read as follows:

“At least a Second Class B.Sc. (Engineering) or Equivalent Degree in Electronics and Communication Engineering, Electronics and Instrumentation, Electrical and Electronics Engineering/Biomedical Engineering, Computer Science and Engineering and Information Technology”.

The Syndicate at its meeting held on 17-7-2010 vide Item 560.30 resolved to approve the above decision taken by the Academic Council and made this effective from 4-2-2010 the date of meeting of the Academic Council.

(3)

No. Conf. II/2941/1/2010 (2).

20th September 2010.

In exercise of the powers conferred under Section 24 (ii) read with Section 42 (1) of Cochin University of Science and Technology Act, 1986, the Academic Council at its meeting held on 4-2-2010 resolved to approve the Regulations and Scheme of Examinations for the courses offered by various Naval Schools under Southern Naval Command as mentioned below:

<i>Sl. No.</i>	<i>Name of Course</i>	<i>Prog. No.</i>	<i>Name of the School</i>	<i>Date of Effect</i>
1	M.Sc. Under Water Science and Technology (Regular and Lateral)	8803& 8811	ASW School	with effect from the courses commenced in 2007
2	M.Sc. Naval Weapons (Regular and Lateral)	8203 & 8202	INS Dronacharya	with effect from the courses commenced in 2009

The Syndicate at its meeting held on 17-7-2010 vide Item 560.30 resolved to approve the above decision made by the Academic Council and made them effective from the date mentioned against each.

#### REGULATIONS FOR M. Sc. UNDERWATER SCIENCE AND TECHNOLOGY

1. Programme No. : 8803
2. Programme Name Civil Equal : M.Sc. (Underwater Science and Technology)
3. Programme Code Naval Equal : LASW
4. Approving Authority : IHQ MoD (N)
5. Eligibility Criteria for Admission : (a) Officer nominated by IHQ MoD (N)  
(b) A Bachelors Degree in Science or equivalent from a recognised University
6. Duration : *Semester I & II*  
(a) 50 weeks technical training after B.Sc. Degree.  
(b) Minimum of 6 weeks On Job Training.  
: *Semester III & IV*  
48 weeks specialisation training at ASW School.  
(Total duration 2 Years as required for M.Sc. degree)
7. Attendance requirement : 80% minimum
8. Nature : (a) Full time  
(b) Based on the credits, GPA will be calculated for Semester III and IV. CGPA will be calculated as per the formula given.  
(c) With effect for Courses which have commenced from 2007.
9. Approved intake capacity : 30
10. Examination Pattern : Exam paper setter will be other than the subject instructor as nominated by Chief Instructor.  
(a) Continuous Examination : 1170 Marks of Continuous Examinations which includes Project Work I and II for 220 Marks and Term Boards (Oral) for 120 Marks.  
(b) End Term : 830 Marks of End Term Exam.  
Total : 2000 Marks.
11. Grading:
  - (a) *Grades*—The following are the grades for performance in individual subject.

<i>Range of Marks</i>	<i>Grades</i>	<i>Weightage</i>
90% and above	S Outstanding	10
80—90%	A Excellent	9
70—80%	B Very Good	8
60—70%	C Good	7
50—60%	D Satisfactory	6
Below 50%	F Failure	0

Where (X-Y) means X is included and Y is excluded.

- (b) *Grade Point Average*—Performance at the end of the Semester is indicated by Grade point average (GPA) calculated as follows for all subjects in the Semester:—

$$\text{GPA} = \frac{G_1 C_1 + G_2 C_2 + G_3 C_3 + \dots + G_n C_n}{C_1 + C_2 + C_3 + \dots + C_n}$$

(G = grade weightage and  
C = corresponding subject Credit)

- (c) *Cumulative Grade Point Average*—Overall performance at the end of the course is indicated by Cumulative grade point average (CGPA) calculated as follows for all subjects:—

$$\text{CGPA} = \frac{C_{\text{III}} (\text{GPA}_{\text{III}}) + C_{\text{IV}} (\text{GPA}_{\text{IV}})}{C_{\text{III}} + C_{\text{IV}}}$$

( $C_{\text{III}}$  and  $C_{\text{IV}}$  credit for Semester III and IV and  $\text{GPA}_{\text{III}}$  and  $\text{GPA}_{\text{IV}}$  grade point average for Semester III and Semester IV)

- (d) The classification on degree would be as follows:—

<i>Classification</i>	<i>CGPA</i>
First Class with Distinction	8 and above
First Class	6.5 and above
Second Class	6 and above

- (e) Details of the course and credit points are as follows:—

<i>Course Code</i>	<i>Paper</i>	<i>C/E</i>	<i>Credit</i>
<b>Semester-III</b>			
2301	Under Water Acoustics	C	04
2302	Digital Electronics	E	02
2303	Applied Mathematics	E	03
2304	Computer Networking	E	03
2305	Sonar Theory I	C	04
2306	Sonar Theory II	C	04
2307	Naval Weapon Systems	C	04
2308	Lofar	C	04
2309	Rocket Launchers	E	02
2310	Torpedoes	C	04
C + E			24 + 10 = 34
<b>Semester-IV</b>			
2401	Under Water Sensors	E	02
2402	Mine and Mine Counter Measures	C	04
2403	Tactics I	C	04
2404	Tactics II	C	04
2405	Tactics III	C	04
2406	Tactics IV	C	04
2407	GASW/seaward defence/demolition	E	02
2408	Project Work I	C	04
2409	Project Work II	C	04
2410	Mid Term Board	C	04
2411	End of term board	C	04
C + E			36 + 04 = 40

## SCHEME OF INSTRUCTIONS &amp; EXAMINATION PROGRAMME No. 8803 (LASW)

**M.Sc. in Underwater Science and Technology**

Sub Code	Subject	Total hours	C/E	Credit	Scheme of Teaching			Scheme of Examination		
					L	P	Duration of T/P Exam in hours	Marks		
								CE	End Term	Total
Semester-III										
2301	Under Water Acoustics	70	C	04	66	04	3	50	50	100
2302	Digital Electronics	30	E	02	29	01	2	25	25	50
2303	Applied Mathematics	50	E	03	50	..	3	40	40	80
2304	Computer Networking	50	E	03	45	05	3	40	40	80
2305	Sonar Theory I	80	C	04	60	20	4	60	60	120
2306	Sonar Theory II	60	C	04	50	10	3	45	45	90
2307	Naval Weapon Systems	80	C	04	70	10	4	60	60	120
2308	Lofar	80	C	04	55	25	4	60	60	120
2309	Rocket Iaunchers	30	E	02	20	10	2	25	25	50
2310	Torpedoes	85	C	04	60	25	4	65	65	130
C + E 24 + 10 = 34							Sub Total	470	470	940
Semester-IV										
2401	Under Water Sensors	25	E	02	20	05	2	20	20	40
2402	Mine and Mine Counter Measures	60	C	04	45	15	3	45	45	90
2403	Tactics I	90	C	04	90	..	4	70	70	140
2404	Tactics II	90	C	04	90	..	4	70	70	140
2405	Tactics III	85	C	04	70	15	4	65	65	130
2406	Tactics IV	85	C	04	70	15	4	65	65	130
2407	GASW/Seaward Defence/Demolition	30	E	02	25	05	2	25	25	50
2408	Project Work I	70	C	04	70	..	3	100	..	100
2409	Project Work II	80	C	04	80	..	4	120	..	120
2410	Mid Term Board	45	C	04	45	..	2	60	..	60
2411	End of term board	45	C	04	45	..	2	60	..	60
C + E 36 + 04 = 40							Sub Total	700	360	1060
Total Duration		1320 Hrs. (48 Weeks)	60+14=74				Total Marks	1170	830	2000

REGULATIONS FOR M. Sc. UNDERWATER SCIENCE AND TECHNOLOGY  
(LATERAL ENTRY)

1. Programme No. : 8811
2. Programme Name Civil Equal : M.Sc. (Underwater Science and Technology)
3. Programme Code Naval Equal : LASW (Lateral)
4. Approving Authority : IHQ MoD (N)



5. Eligibility Criteria for Admission : (a) A Bachelors Degree in Science or equivalent from a recognised University
- (b) Successfully completed Long ASW course from the school consisting of Semester I and II of 50 weeks of technical training and minimum of 6 weeks of on job training and 48 weeks of specialized training at ASW School.
6. Duration : Will undergo Semester IV consisting of 20 weeks of specialized training at ASW School along with regular batch. (Total Duration 2 years as required for M.Sc. degree)
7. Attendance requirement : 80% minimum
8. Nature : (a) Selected Candidates are to formally register at the beginning of IV Semester of M. Sc. in Underwater Science and Technology and join with regular batch of Programme 8803.
- (b) Selected Candidates are to qualify the IV Semester examinations along with the regular batch including a dissertation
- (c) Credits based on the current formula for course and credits GPA for the III Semester will be transferred based on the performance of the candidate in corresponding/equivalent papers in previous qualifying long course.
9. Approved intake capacity : 20
10. Examination Pattern : Exam paper setter will be other than the Subject Instructor as nominated by Chief Instructor
- (b) Continuous Examination 1170 Marks of Continuous Examinations which includes Dissertation, Project Work for 220 Marks and Term Boards (Oral) for 120 Marks
- (c) End Term 830 Marks of End Term Exam
- Total : 2000 marks

11. Grading :

- (a) *Grades.*— The following are the grades for performance in individual subject.

<i>Range of Marks</i>	<i>Grades</i>	<i>Weightage</i>
90% and above	S Outstanding	10
80—90%	A Excellent	9
70—80%	B Very Good	8
60—70%	C Good	7
50—60%	D Satisfactory	6
Below 50%	F Failure	0

Where (X-Y) means X is included and Y is excluded.

- (b) *Grade Point Average.*—Performance at the end of the Semester is indicated by Grade Point Average (GPA) calculated as follows for all subjects in the Semester:—

$$\text{GPA} = \frac{G_1 C_1 + G_2 C_2 + G_3 C_3 + \dots + G_n C_n}{C_1 + C_2 + C_3 + \dots + C_n}$$

(G = grade weightage and  
C = corresponding subject Credit)

- (c) *Cumulative Grade Point Average*—Overall performance at the end of the course is indicated by Cumulative Grade Point Average (CGPA) calculated as follows for all subjects:—

$$CGPA = \frac{C_{III} (GPA_{III}) + C_{IV} (GPA_{IV})}{C_{III} + C_{IV}} \quad (C_{III} \text{ and } C_{IV} \text{ credit for Semester III and IV and } GPA_{III} \text{ and } GPA_{IV} \text{ Grade Point Average for Semester III and Semester IV})$$

- (d) The Classification on degree would be as follows:—

<i>Classification</i>	<i>CGPA</i>
First Class with distinction	8 and above
First Class	6.5 and above
Second Class	6 and above

- (e) Details of the course and credit points are as follows:—

<i>Course Code</i>	<i>Paper</i>	<i>C/E</i>	<i>Credit</i>
<b>Semester-III</b>			
2301	Under Water Acoustics	C	04
2302	Digital Electronic	E	02
2303	Applied Mathematics	E	03
2304	Computer Networking	E	03
2305	Sonar Theory I	C	04
2306	Sonar Theory II	C	04
2307	Naval Weapon Systems	C	04
2308	Lofar	C	04
2309	Rocket Launchers	E	02
2310	Torpedoes	C	04
		C + E	24 + 10 = 34
<b>Semester-IV</b>			
2401	Under Water Sensors	E	02
2402	Mine and Mine Counter Measures	C	04
2403	Tactics I	C	04
2404	Tactics II	C	04
2405	Tactics III	C	04
2406	Tactics IV	C	04
2407	GASW/seaward defence/demolition	E	02
2408	Dissertation	C	04
2409	Project Work	C	04
2410	Mid Term Board	C	04
2411	End of Term Board	C	04
		C + E	36 + 04 = 40

#### SCHEME OF INSTRUCTIONS AND EXAMINATION LONG ASW (LATERAL ENTRY)-8811

##### M. Sc. in Underwater Science and Technology

<i>Sub Code</i>	<i>Subject</i>	<i>Total hours</i>	<i>C/E</i>	<i>Credit</i>	<i>Scheme of Teaching</i>			<i>Scheme of Exams.</i>		
					<i>L</i>	<i>P</i>	<i>Duration of T/P Exams. in hours</i>	<i>Marks</i>		
								<i>CE</i>	<i>End Term</i>	<i>Total</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<b>Semester-III</b>										
2301	Under Water Acoustics	70	C	04	66	04	3	50	50	100
2302	Digital Electronics	30	E	02	29	01	2	25	25	50

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2303	Applied Mathematics	50	E	03	50	..	3	40	40	80
2304	Computer Networking	50	E	03	45	05	3	40	40	80
2305	Sonar Theory I	80	C	04	60	20	4	60	60	120
2306	Sonar Theory II	60	C	04	50	10	3	45	45	90
2307	Naval Weapon Systems	80	C	04	70	10	4	60	60	120
2308	Lofar	80	C	04	55	25	4	60	60	120
2309	Rocket launchers	30	E	02	20	10	2	25	25	50
2310	Torpedoes	85	C	04	60	25	4	65	65	130
			C + E		24+10 = 34		Sub Total	470	470	940
Semester-IV										
2401	Under Water Sensors	25	E	02	20	05	2	20	20	40
2402	Mine and Mine Counter Measures	60	C	04	45	15	3	45	45	90
2403	Tactics I	90	C	04	90	..	4	70	70	140
2404	Tactics II	90	C	04	90	..	4	70	70	140
2405	Tactics III	85	C	04	70	15	4	65	65	130
2406	Tactics IV	85	C	04	70	15	4	65	65	130
2407	GASW/Seaward defence/Demolition	30	E	02	25	05	2	25	25	50
2408	Dissertation	70	C	04	70	..	3	100	..	100
2409	Project Work	80	C	04	80	..	4	120	..	120
2410	Mid Term Board	45	C	04	45	..	2	60	..	60
2411	End of Term Board	45	C	04	45	..	2	60	..	60
			C + E		36+04 = 40		Sub Total	700	360	1060
Total Duration		1320 Hrs. (48 Weeks)		60 +14 = 74		Total Marks		1170	830	2000

**REGULATIONS: NAVAL WEAPONS (REGULAR)**

1. Programme No. : 8203
2. Programme Name : M.Sc. (Naval Weapons)
3. Programme Code : Long Gunnery
4. Approving Authority : IHQ MoD (N)
5. Eligibility Criteria for Admission : (a) Officer nominated by IHQ MoD (N)  
(b) A Graduate Degree in Science/Technology in any discipline from any recognised University
6. Duration : (a) Semester I & II would consist of 50 weeks of technical training and 6 weeks of on the job training  
(b) Semester III & IV would consist 48 weeks of specialised training at INS Dronacharya.
7. Attendance requirement : 80% Minimum
8. Nature : (a) Full time  
(b) Based on the credits GPA will be calculated for Semester III and IV CGPA will be calculated as per the formula given.  
(c) With effect from the course commenced in 2009.
9. Approved intake capacity : 30
10. Examination Pattern : Exam paper setter will be other than the subject instructor nominated by Training Commander.  
(a) Continuous Evaluation : 1150 Marks (which includes Gunnery, Tactics boards, Dissertation/Project Work).

(b) End Term Examination	: 850 Marks
Total	: 2000 Marks

11. *Grading:*

- (a) *Grades*—The following are the grades for performance in individual subject.

<i>Range of Marks*</i>	<i>Grades</i>	<i>Weightage</i>
90% and above	S Outstanding	10
80—90%	A Excellent	9
70—80%	B Very Good	8
60—70%	C Good	7
50—60%	D Satisfactory	6
Below 50%	F Failure	0

\* *Note:*—Upper limit is not included in the class interval.

- (b) *Grade Point Average*—Performance at the end of the semester is indicated by Grade point average (GPA) calculated for all subjects as follows:—

$$\text{GPA} = \frac{G_1 C_1 + G_2 C_2 + G_3 C_3 + \dots + G_n C_n}{C_1 + C_2 + C_3 + \dots + C_n}$$

Where, G = Grade weightage

C = Corresponding Subject Credit

- (c) *Cumulative Grade Point Average*—The CGPA will be calculated using GPA and course credits of each semester as follows:—

$$\text{CGPA} = \frac{C_{III} (\text{GPA}_{III}) + C_{IV} (\text{GPA}_{IV})}{C_{III} + C_{IV}}$$

- (d) The classification on degree would be as follows:—

<i>Classification</i>	<i>CGPA</i>
First Class with distinction	8 and above
First Class	6.5 and above
Second Class	6 and above

- (e) Details of the course credits points are as follows:—

<i>SER</i>	<i>Paper</i>	<i>C/E</i>	<i>Credit</i>
(1)	(2)	(3)	(4)
<b>Semester-III</b>			
20301	Radar Theory and Electronics	C	4
20302	Theory of Gunnery, Fibre Optics, Lasers & Thermal Imaging	E	3
20303	Principles of Ordnance and Armament, Explosive Chemistry and General Gunnery	C	4
20304	Basics of Naval Weapon Systems, Missile Control	C	4
20305	Guidance, Kinematics and Propulsion	E	2
20306	Surveillance and Fire Control Radar Systems	C	4
20307	Design, Concept and Operation of Surface to Surface Missiles (Part I)	E	3
20308	Design, Concept and Operation of Surface to Surface Missiles (Part II)	C	4
20309	Design, Concept and Operation of Surface to Air Missiles	C	4
20310	Theory and Practical of Naval Guns and Chaff Systems	C	4
<b>Semester-IV</b>			
20401	Tactics I-Maritime Surface Warfare and Tactics	C	4
20402	Tactics II-Ship Handling and Tactics	C	4

(1)	(2)	(3)	(4)
20403	Tactics III-Maritime Sub Surface Warfare and Tactics	C	4
20404	Tactics IV-Maritime Warfare Tactics	C	4
20405	Operational, Fighting and Equipment Efficiency	C	4
20406	Theory and Practical of Small Arms	E	3
20407	Theory and Practical of Drill and Ceremonials	E	3
20408	Project Work	C	4
20409	Gunnery Board	C	4
20410	Tactics Board	C	3

#### SCHEME OF INSTRUCTIONS & EXAMINATION

#### M. Sc. Course in Naval Weapons Programme No 8203 (Long Gunnery Course)

SER	Paper	Total hours	Type	Credit	Scheme of Learning		Scheme of Examination			
					L	P	Dur. of T/P Exam. hours	Marks		
								Continuous Evaluation	End Term	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<b>Semester-III</b>										
20301	Radar Theory and Electronics	80	C	4	60	20	3	50	50	100
20302	Theory of Gunnery, Fibre Optics, Lasers & Thermal Imaging	70	E	3	50	20	3	45	45	90
20303	Principles of Ordnance and Armament, Explosive Chemistry and General Gunnery	90	C	4	90	..	4	55	55	110
20304	Basics of Naval Weapon Systems, Missile Control	100	C	4	100	..	3	60	60	120
20305	Guidance, Kinematics and Propulsion	60	E	2	60	..	3	40	40	80
20306	Surveillance and Fire Control Radar Systems	80	C	4	60	20	3	50	50	100
20307	Design, Concept and Operation of Surface to Surface Missiles (Part I)	70	E	3	50	20	3	45	45	90
20308	Design, Concept and Operation of Surface to Surface Missiles (Part II)	80	C	4	60	20	3	50	50	100
20309	Design, Concept and Operation of Surface to Air Missiles	80	C	4	80	..	3	50	50	100
20310	Theory and Practical of Naval Guns and Chaff Systems	90	C	4	70	20	3	55	55	110
Sub Total		800	..	36	680	120	31	500	500	1000
<b>Semester-IV</b>										
20401	Tactics I-Maritime Surface Warfare and Tactics	80	C	4	80	..	3	50	50	100
20402	Tactics II-Ship Handling and Tactics	80	C	4	80	..	3	50	50	100
20403	Tactics III-Maritime Sub Surface Warfare and Tactics	90	C	4	70	20	3	55	55	110

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
20404	Tactics IV-Maritime Warfare Tactics	80	C	4	60	20	3	55	55	110
20405	Operational, Fighting and Equipment Efficiency	80	C	4	80	..	4	50	50	100
20406	Theory and Practical of Small Arms	70	E	3	20	50	3	45	45	90
20407	Theory and Practical of Drill and Ceremonials	70	E	3	20	50	3	45	45	90
20408	Project Work	90	C	4	90	..	4	110	..	110
20409	Gunnery Board	80	C	4	80	..	4	100	..	100
20410	Tactics Board	70	C	3	70	..	4	100	..	90
Sub Total		800	..	37	660	140	34	650	350	1000
Grand Total (Semester III + Semester IV)		1600	C+E=59+14=	73	1340	260	65	1150	850	2000

#### REGULATIONS: NAVAL WEAPONS (LATERAL ENTRY)

1. Programme No. : 8202
2. Programme Name : M.Sc. (Naval Weapons)
3. Programme Code : Long Gunnery (Lateral Entry)
4. Approving Authority : IHQ MoD (N)
5. Eligibility Criteria for Admission :
  - (a) Graduate Degree in Science/Technology in any discipline from any recognised University
  - (b) Successfully completed Long Gunnery course consisting of Semester I and II of 50 weeks of technical training and 06 weeks of on the job training and 48 weeks in regular programme of specialised training at INS Dronacharya.
6. Duration : Undergo Semester IV consisting of 24 weeks of specialised training at INS Dronacharya along with the regular batch.
7. Attendance requirement : 80% minimum
8. Nature :
  - (a) Selected candidates are to formally register at the beginning of IV Semester of M. Sc. (Naval Weapons) and join with the regular batch of Programme 8203.
  - (b) Selected candidates are to qualify IV Semester Examination along with the regular batch and submit a dissertation
  - (c) Based on the current formula for course and credits, GPA for the Semester III will be transferred based on the performance of the candidates in corresponding/equivalent papers in the previous qualifying long Gunnery Course.
9. Approved intake capacity : 20
10. Examination Pattern : Exam paper setter will be other than the Subject Instructor nominated by Training Commander.
  - (a) Continuous Evaluation : 1150 Marks (which includes Gunnery, Tactics Boards, Dissertation/Project Work)
  - (b) End Term Examination : 850 Marks
- Total : 2000 Marks

11. Grading :

- (a) *Grades*.—The following are the grades for performance in individual subject.

<i>Range of Marks*</i>	<i>Grades</i>	<i>Weightage</i>
90% and above	S Outstanding	10
80-90%	A Excellent	9
70-80%	B Very Good	8
60-70%	C Good	7
50-60%	D Satisfactory	6
Below 50%	F Failure	0

\*Note:—Upper limit is not included in the class interval

- (b) *Grade Point Average*.—Performance at the end of the semester is indicated by Grade Point Average (GPA) calculated for all subjects as follows :—

$$\text{GPA} = \frac{G_1 C_1 + G_2 C_2 + G_3 C_3 + \dots + G_n C_n}{C_1 + C_2 + C_3 + \dots + C_n}$$

Where G = Grade Weightage

C = Corresponding Subject Credit

- (c) *Cumulative Grade Point Average*.—The CGPA will be calculated using GPA and course credits of each semester as follows:—

$$\text{CGPA} = \frac{C_{III} (\text{GPA}_3) + C_{IV} (\text{GPA}_4)}{C_{III} + C_{IV}}$$

- (d) The Classification on degree would be as follows:—

<i>Classification</i>	<i>CGPA</i>
First Class with distinction	8 and above
First Class	6.5 and above
Second Class	6 and above

- (e) Details of the course and credit points are as follows:—

<i>SER</i>	<i>Paper</i>	<i>C/E</i>	<i>Credit</i>
(1)	(2)	(3)	(4)
<b>Semester-III</b>			
20301	Radar Theory and Electronics	C	4
20302	Theory of Gunnery, Fibre Optics, Lasers & Thermal Imaging	E	3
20303	Principles of Ordnance and Armament, Explosive Chemistry and General Gunnery	C	4
20304	Basics of Naval Weapon Systems, Missile Control	C	4
20305	Guidance, Kinematics and Propulsion	E	2
20306	Surveillance and Fire Control Radar Systems	C	4
20307	Design, Concept and Operation of Surface to Surface Missiles (Part I)	E	3
20308	Design, Concept and Operation of Surface to Surface Missiles (Part II)	C	4
20309	Design, Concept and Operation of Surface to Air Missiles	C	4
20310	Theory and Practical of Naval Guns and Chaff Systems	C	4
<b>Semester-IV</b>			
20401	Tactics I-Maritime Surface Warfare and Tactics	C	4
20402	Tactics II-Ship Handling and Tactics	C	4
20403	Tactics III-Maritime Sub Surface Warfare and Tactics	C	4
20404	Tactics IV-Maritime Warfare Tactics	C	4
20405	Operational, Fighting and Equipment Efficiency	C	4

(1)	(2)	(3)	(4)
20406	Theory and Practical of Small Arms	E	3
20407	Theory and Practical of Drill and Ceremonials	E	3
20408	Dissertation	C	4
20409	Gunnery Board	C	4
20410	Tactics Board	C	3

SCHEME OF INSTRUCTIONS & EXAMINATION

**M.Sc. Course in Naval Weapons (Lateral Entry) Programme No. 8202 (Long Gunnery Course)**

SER	Paper	Total hours	Type	Credit	Scheme of Learning		Dur. of T/P Exam hours	Examination Marks		Total
					L	P		Continuous Evaluation	End Term	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
<b>Semester-III</b>										
20301	Radar Theory and Electronics	80	C	4	60	20	3	50	50	100
20302	Theory of Gunnery, Fibre Optics, Lasers & Thermal Imaging	70	E	3	50	20	3	45	45	90
20303	Principles of Ordnance and Armament, Explosive Chemistry and General Gunnery	90	C	4	90	..	4	55	55	110
20304	Basics of Naval Weapon Systems, Missile Control	100	C	4	100	..	3	60	60	120
20305	Guidance, Kinematics and Propulsion	60	E	2	60	..	3	40	40	80
20306	Surveillance and Fire Control Radar Systems	80	C	4	60	20	3	50	50	100
20307	Design, Concept and Operation of Surface to Surface Missiles (Part I)	70	E	3	50	20	3	45	45	90
20308	Concept and Operation of Surface to Missiles (Part II)	80	C	4	60	20	3	50	50	100
20309	Design, Concept and Operation of Surface to Air Missiles	80	C	4	80	..	3	50	50	100
20310	Theory and Practical of Naval Guns and Chaff Systems	90	C	4	70	20	3	55	55	110
Sub Total		800	..	36	680	120	31	500	500	1000
<b>Semester-IV</b>										
20401	Tactics I-Maritime Surface Warfare and Tactics	80	C	4	80	..	3	50	50	100
20402	Tactics II-Ship Handling and Tactics	80	C	4	80	..	3	50	50	100
20403	Tactics III-Maritime Sub Surface Warfare and Tactics	90	C	4	70	20	3	55	55	110
20404	Tactics IV-Maritime Warfare Tactics	80	C	4	60	20	3	55	55	110
20405	Operational, Fighting and Equipment Efficiency	80	C	4	80	..	4	50	50	100



(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
20406	Theory and Practical of Small Arms	70	E	3	20	50	3	45	45	90
20407	Theory and Practical of Drill and Ceremonials	70	E	3	20	50	3	45	45	90
20408	Dissertation	90	C	4	90	..	4	110	..	110
20409	Gunnery Board	80	C	4	80	..	4	100	..	100
20410	Tactics Board	70	C	3	70	..	4	100	..	90
Sub Total		800	..	37	660	140	34	650	350	1000
Grand Total (Semester III+ Semester IV)		1600	C+E=59+14=73	1340	260	65		1150	850	2000

(4)

No. Conf. II/2941/1/2010 (4).

20th September 2010.

*Read:—*Not. No. Conf. II/2941/2/09 dated 18-1-2009; Regulations for 5 year BB.A LL.B (Hons.) Degree (2009 admission)

In exercise of the powers conferred under Section 24 (ii) read with Section 42 (1) of Cochin University of Science and Technology Act, 1986 (Act 31 of 1986) the Academic Council at its meeting held on 4-2-2010 resolved to amend the 'Clause 6' of BB.A. LL.B. (Hons.) Regulation (2009 admissions) as follows :

<i>Existing</i>	<i>Approved</i>
Candidates who have not crossed 20 years of age as on July 1 of the year of admission (22 years in the case of SC/ST/OBC's).	Candidates who have not crossed 20 years of age as on January 1 of the year of admission (22 years in the case of SC/ST/OBC's).

The Syndicate at its meeting held on 17-7-2010 vide Item No. 560.30 resolved to approve the same and made this effective from 4-2-2010 the date of meeting of the Academic Council.

(5)

No. Conf. II/2941/2/2010 (6).

22nd September 2010.

In exercise of the powers conferred under Section 24 (ii) read with Section 42 (1) of CUSAT Act 1986, (Act 31 of 1986) the Academic Council at its meeting held on 4-2-2010 resolved to approve the following :

- (i) The modified schemes of Examinations for M.Sc. Marine Geology and Marine Geophysics Courses with effect from 2010-11 batch (App.)
- (ii) To make following amendments in the eligibility qualification for admission to M.Phil. in Fisheries Science offered by the School of Industrial Fisheries with effect from 2008-09 onwards as follows :

“M.Sc. Degree in Industrial Fisheries/Marine Biology/Zoology/Aquatic Biology and Fisheries/Fishery Biology and Aquaculture/Capture and Culture Fisheries/Aquaculture/M.F.Sc./ M. Sc. Applied Fisheries and Aquaculture/ M.Sc.Aquaculture and Fish Processing or any other Post Graduate Degree in Fisheries and allied subjects.”

The Syndicate at its meeting held on 17-7-2010 vide Item 560.30 approved the above Academic Council decision.

M.Sc. MARINE GEOLOGY (w.e.f. 2010-11 batch)  
(Revised Syllabus passed by the BOS on 17-7-2009)

<i>Course Code</i>	<i>Paper</i>	<i>Core/Elective</i>	<i>Credits</i>
<b>Semester-I</b>			
MGO 2101	Mineralogy	Core	3
MGO 2102	Igneous & Metamorphic Petrology	Core	3
MGO 2103	Structural Geology	Core	3
MGO 2104	Invertebrate and Micro Paleontology	Core	3
MGO 2105	Mineralogy (Practical)	Core	1
MGO 2106	X-Ray Mineralogy (Practical)	Core	1
MGO 2107	Petrology (Practical)	Core	1
MGO 2108	Structural Geology (Practical)	Core	1
MGO 2109	Paleontology (Practical)	Core	1
<b>Semester-II</b>			
MGO 2201	Stratigraphy	Core	3
MGO 2202	Ground Water Geology	Core	3
MGO 2203	Economic Geology	Core	3
MGO 2204	Geochemistry	Core	3
MGO 2205	Economic Geology (Practical)	Core	1
MGO 2206	Geological Mapping (Practical)	Elective	1
MGO 2207	Geology in Coastal Zone Management	Elective	3
MGO 2208	Paleoceanography & Climate	Elective	3
MGO 2209	Geological Exploration Techniques	Elective	3
MGO 2210	Geomorphology	Elective	3
MGO 2211	Geochemistry (Practical)	Core	1
<b>Semester-III</b>			
MGO 2301	Geology of the Ocean Floor	Core	3
MGO 2302	Sedimentary Geology	Core	3
MGO 2303	Geophysics and Offshore Exploration	Core	3
MGO 2304	Submarine Geomorphology (Practical)	Core	1
MGO 2305	Sedimentology (Practical)	Core	1
MGO 2306	Applied Micropaleontology	Elective	3
MGO 2307	Environmental Geology	Elective	3
MGO 2308	Clays and Clay minerals	Elective	4
MGO 2309	Geoenvironments of Mangroves	Elective	3
MGO 2310	Engineering Geology	Elective	3
<b>Semester-IV</b>			
MGO 2401	Coastal Process and Evolution	Core	3
MGO 2402	Marine Sediments	Core	3
MGO 2403	Marine Mineral Resources	Core	3
MGO 2404	Coastal Geology (Practical)	Core	1
MGO 2405	Project Work	Core	6
MGO 2406	Isotope Geology	Elective	4

M.Sc. MARINE GEOPHYSICS (w.e.f. 2010-11 batch)  
(Revised Syllabus passed by the BOS on 17-7-2009)

<i>Course Code</i>	<i>Paper</i>	<i>Core/Elective</i>	<i>Credits</i>
<b>Semester-I</b>			
MGP 2101	Electronics for Instrumentation	Core	3
MGP 2102	General Geology	Elective	3
MGP 2103	Physics of the Earth	Core	3
MGP 2104	Magnetic Prospecting	Core	3
MGP 2105	Computations in Earth Sciences (Practical)	Core	2
MGP 2106	Electronics (Practical)	Core	2
<b>Semester-II</b>			
MGP 2201	Structural Geology & Stratigraphy	Core	4
MGP 2202	Gravity Prospecting	Core	3
MGP 2203	Ground Water Geophysics	Core	3
MGP 2204	Digital Signal Processing	Core	3
MGP 2205	Geophysical Computation-I (Practical)	Core	2
MGP 2206	Geology (Practical)	Core	1
MGP 2207	Digital Signal Processing (Practical)	Core	2
MGP 2208	Electrical and Electromagnetic Methods	Elective	3
<b>Semester-III</b>			
MGP 2301	Marine Geology	Core	3
MGP 2302	Seismology & Seismic Prospecting	Core	3
MGP 2303	Well Logging	Core	3
MGP 2304	Sub Bottom Sampling Techniques and Shipboard Training (Practical)	Core	1
MGP 2305	Geophysical Field Work (Practical)	Core	1
MGP 2306	Geophysical Computations-II (Practical)	Core	2
MGP 2307	Marine Geology (Practical)	Core	1
MGP 2308	Marine Mineral Resources	Elective	3
<b>Semester-IV</b>			
MGP 2401	Offshore Exploration	Core	3
MGP 2402	Geodynamics	Core	3
MGP 2403	Project Work	Core	6
MGP 2404	Remote Sensing	Elective	3
MGP 2405	Microprocessor & PC Based Instrumentation	Elective	3
MGP 2406	Petroleum Geology	Elective	3

(6)

No. Conf. II/2941/1/2010 (7).

4th October 2010.

The Academic Council at its meeting held on 4-2-2010, in exercise of its powers conferred by Section 24 (ii) read with 42 (1) of CUSAT Act 1986, resolved to approve the revised course structure of M.Sc. Statistics and M.Phil. Statistics with effect from 2010 admission onwards, as appended.

The Syndicate at its meeting held on 17-7-2010 vide Item 560.30 resolved to approve the above resolution of the Academic Council.

## M.Sc. (STATISTICS)—COURSE STRUCTURE

(with effect from 2010 Admission onwards)

### Objectives

The present course is intended to provide a platform for talented students to undergo higher studies in the subject as well as to train them to suit for the needs of the society. Apart from teaching core Statistics subjects, the students are also trained to handle real life problems through the practical classes. As a part of the course the students are taught some programming languages and also exposed to various Statistical softwares such as SPSS, MATLAB, SAS etc.

### Eligibility

B.Sc. Degree in Mathematics or Statistics main with at least 55% marks for the optional subjects taken together.

Duration of the Course	:	Four Semesters
Examination	:	Credit and Semester
Intake	:	20

<i>Course Code</i>	<i>Title of Paper</i>	<i>Core/ Elective</i>	<i>Credits</i>	<i>Contact Hours/ Week</i>	<i>Continuous Evaluation Marks</i>	<i>External Evaluation Marks</i>	<i>Total Marks</i>
<b>Semester-I</b>							
STA 2101	Mathematical Methods for Statistics	C	4	5	50	50	100
STA 2102	Probability Theory I	C	4	5	50	50	100
STA 2103	Probability Distributions	C	4	5	50	50	100
STA 2104	Sampling Theory & Methods	C	4	5	50	50	100
STA 2105	Elective I	E	3	5	50	50	100
<b>Semester-II</b>							
STA 2201	Statistical Inference I	C	4	5	50	50	100
STA 2202	Probability Theory II	C	4	5	50	50	100
STA 2203	Stochastic Processes	C	4	5	50	50	100
STA 2204	Practical I and Viva Voce	C	3	4	50	50*	100
STA 2205	Elective II	E	3	5	50	50	100
<b>Semester-III</b>							
STA 2301	Statistical Inference II	C	4	5	50	50	100
STA 2302	Multivariate Analysis	C	4	5	50	50	100
STA 2303	Applied Regression Analysis	C	4	5	50	50	100
STA 2304	Practical-II using SPSS/ MATLAB and Viva Voce	C	3	4	50	50*	100
STA 2305	Elective III	E	3	5	50	50	100
<b>Semester-IV</b>							
STA 2401	Design and Analysis of Experiments	C	4	5	50	50	100
STA 2402	Statistical Quality Assurance	C	4	5	50	50	100
STA 2403	Practical-III using SAS/R and Viva Voce	C	3	4	50	50*	100
STA 2404	Elective IV	E	3	5	50	50	100
STA 2405	Elective V	E	3	5	50	50	100

\* The Viva Voce examinations in STA 2204, STA 2304 & STA 2403 are to be conducted externally with at least one external examiner (50 marks).

*List of Elective Papers:*

1. Actuarial Statistics
2. Advanced Distribution Theory
3. Advanced Probability Theory
4. Advanced Stochastic Processes
5. Applied Multivariate Statistical Analysis
6. Applied Statistics for National Development
7. Complex Analysis and Integral Transforms
8. Demographic Techniques
9. Directional Data Analysis
10. Inference for Stochastic Processes
11. Operations Research
12. Reliability Modelling and Analysis
13. Statistical Computing
14. Statistical Decision Theory
15. Statistical Forecasting
16. Statistical Genetics
17. Stochastic Finance
18. Survival Analysis
19. Time Series Analysis

**M.Phil. STATISTICS COURSE STRUCTURE**

(with effect from 2010 Admission onwards)

**Objectives**

The present course is intended to provide a platform for talented students to undergo higher studies in the subject as well as to train them to suit for the needs of the society.

**Eligibility**

M.Sc. Degree in Statistics main with at least 55% marks.

Duration of the Course	:	Two Semesters
Examination	:	Credit and Semester
Intake	:	6

**Semester-I**

<i>Course Code</i>	<i>Title of Paper</i>	<i>Core/ Elective</i>	<i>Contact Hours/Week</i>	<i>Continuous Evaluation Marks</i>	<i>Total Marks</i>
STA 3101	Probability and Statistical Inference	C	15	200	200
STA 3102	Elective	E	15	200	200

**Semester-II**

<i>Course Code</i>	<i>Title of Paper</i>	<i>Core/ Elective</i>	<i>Continuous Evaluation Marks</i>	<i>Total Marks</i>
STA 3201	Dissertation	C	300	300
STA 3202	Viva Voce	C	100	100